

9/2

Notice of Allowability

Application No.

09/697,481

Examiner

Donald L. Storm

Applicant(s)

BHATTACHARYA ET AL.

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to REPLY filed August 9, 2004.
2. ☒ The allowed claim(s) is/are 1,3-5,7-10,12-19,21-26 and 30.
3. ☒ The drawings filed on 26 October 2000 and 09 August 2004 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the Applicant, an amendment may be filed as provided by 37 CFR § 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee. Authorization for this examiner's amendment was given by telephone call from Mr. Walter J. Kawula, Jr., Attorney of Record, on November 23, 2004.

The application has been amended as follows:

IN THE SPECIFICATION:

On page 9, after the paragraph beginning "Figure 8 depicts . . .", insert the following new paragraph:

Figure 9 depicts a flow chart of a method to design an inverse filter according to the invention.

On page 18, prior to the paragraphs numbered 1-7, insert the following new paragraph:

The illustrated inverse filter may be designed using several methods, the following steps illustrated in Fig. 9 describe one method to design the inverse filter.

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A method of signal processing signals having transmission path characteristics, comprising the steps of:

inverse filtering an input signal having transmission path characteristics before processing the input signal wherein the transmission path characteristics of the input signal are reduced; and

processing the input signal;

wherein an inverse filter is used to filter the input signal and an encoder is used to process the input signal, the inverse filter being in communication with the encoder;

the inverse filter having an inverse amplitude response of a filter described by $h(t)$, the filter approximating noisy ambient conditions including telephone-channel-bandwidth conditions and the ~~pre-filter~~ inverse filter response being characterized by:

$$G(\omega) \approx \frac{1}{|H(\omega)|}$$

wherein $H(\omega)$ is the frequency response of $h(t)$ and $G(\omega)$ is the inverse filter frequency response.

10. (Currently Amended) The method of claim 9 wherein $|G(\omega)|^2$ is characterized by the equation

$$|G(\omega)|^2 = \frac{1}{|1 + \sum_{k=1}^p a_k e^{-j\omega k}|^2}$$

wherein a_k are the p obtained coefficients a_1, \dots, a_p .

13. (Currently Amended) The method of claim 8 wherein the inverse Fast Fourier Transform (IFFT) of $P(k)$ is characterized by:

$$\text{IFFT}(P(k)) = R(m) = \sum_{k=0}^{M-1} \frac{1}{|H(k)|^2} * e^{\frac{j2\pi km}{M-1}}.$$

16. (Currently Amended) The method of claim 15 wherein the using the moving average model average model parameters to design the inverse filter comprises the sub-steps of:

applying the parameters to the equation:

$$|G(\omega)|^2 = \frac{1}{|1 + \sum_{k=1}^p a_k e^{-j\omega k}|^2} = \frac{1}{|H(\omega)|^2}$$

wherein $G(\omega)$ is the frequency response of the pre-filter inverse filter and a_k are the p model parameters a_1, \dots, a_p ; and
using $G(\omega)$ to design the inverse filter.

24. (Currently Amended) The method of claim 17, wherein the obtained data further includes spectral amplitude information; and wherein the preprocessing the received encoded data step further includes the sub-steps of:

adjusting a number k of harmonics for a spectrum of a frame having a new pitch parameter.

30. (Currently Amended) A speech system comprising:

- an inverse filtering means for inverse filtering signal data having transmission path characteristics;
- an encoder, the encoder including parameterizing means for parameterizing the signal data and encoding means for encoding the signal data, the encoder being in communication with the inverse filtering means;
- a parameter preprocessor, the parameter preprocessor including receiving means for receiving the encoded signal data and preprocessing means for preprocessing the received encoded signal data, the preprocessing means including:
 - means for obtaining signal data from the received encoded data, wherein the obtained data includes pitch parameter data for a trajectory of successive frames of the signal data;
 - means for removing at least one pitch parameter departure from the trajectory of successive frames;
 - means for smoothing the trajectory;
 - means for calculating at least one multiple corresponding to an obtained pitch parameter of a frame having a pitch parameter departure and at least one sub-multiple corresponding to the obtained pitch parameter;
 - means for comparing a pitch parameter from the removed and smoothened trajectory that corresponds to the obtained pitch parameter with the at least one corresponding multiple and the at least one corresponding sub-multiple; and
 - means for replacing the obtained pitch parameter with a new pitch parameter based on the comparison, the new pitch parameter being selected from the at least one corresponding multiple and the at least one corresponding sub-multiple
- the parameter preprocessor being in communication with the encoder;
- a decoder, the decoder including decoding means for decoding the preprocessed signal data and synthesizing means for synthesizing the preprocessed signal data into a speech signal, the decoder being in communication with the parameter preprocessor.

Allowable Subject Matter

2. Claims 1, 3-5, 7-10, 12-19, 21-26, and 30 are allowed. The claims have been renumbered for printing to be claims 1, 2-4, 5-8, 9-16, 17-22, and 23.

Response to Arguments

3. The prior Office action, mailed May 6, 2004 (paper 5), requires corrected drawings, objects to the drawings and claims, and rejects claims under 35 USC § 102 and § 103. The Applicant's arguments and changes in REPLY filed August 9, 2004 have been fully considered with the following results.

4. The proposed additional drawing submitted by the Applicant was received on August 9, 2004, and this drawing sheet is substantively acceptable to the Examiner. This drawing has been entered and is now the Fig. 9 of record.

5. With respect to objection to the drawings, the changes entered by amendment are sufficiently descriptive. Accordingly, the objection is removed.

6. With respect to objection to the claims dependent upon rejected base claims, the base claims have been allowed. Accordingly, the objections are removed.

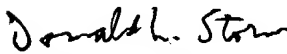
7. With respect to objection to the claims for undefined terms, the changes entered by amendment provide defined terms. Accordingly, the objections are removed.

8. With respect to rejection of claims under 35 USC § 102 and § 103, the changes entered by amendment include subject matter previously indicated as allowable in the independent claims. Accordingly, the rejections are removed.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald L. Storm, of Art Unit 2654, whose telephone number is (703) 305-3941. The examiner can normally be reached on weekdays between 8:00 AM and 4:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see <http://pair-direct.uspto.gov>.


Donald L. Storm
November 24, 2004


RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER